2021 International Nuclear Atlantic Conference – INAC 2021
Virtual meeting, Brazil, November 29 – December 2, 2021

ISBN: 978-65-594-1256-3

Assessment of the particular demand for ^{18}FDG/PET-CT procedures: a discussion regarding new incorporations by the SUS

M. S. Silva[1], P. C. Santana[2], and A. S. M. Batista[3]

[1]*marlon_santossilva@yahoo.com.br,*
Departamento de Anatomia e Imagem – Faculdade de Medicina, UFMG
Av. Alfredo Balena, 190, 30130-110 - Belo Horizonte, MG, Brasil

[2]*pridili@gmail.com,*
Departamento de Anatomia e Imagem – Faculdade de Medicina, UFMG
Av. Alfredo Balena, 190, 30130-110 - Belo Horizonte, MG, Brasil

[3]*adriananuclear@yahoo.com.br,*
Departamento de Anatomia e Imagem – Faculdade de Medicina, UFMG
Av. Alfredo Balena, 190, 30130-110 - Belo Horizonte, MG, Brasil

1. Introduction

Positron Emission Tomography associated with Computed Tomography (PET-CT) is a molecular imaging modality that has been clinically available in Brazil since 2003, however, the technology faced some difficulties to expand and consolidate itself as a diagnostic method. In 2012 it was included in the list of procedures of the National Supplementary Health Agency (ANS), paying for tests with the following diagnostic indications: non-small cell lung cancer to characterize lesions and staging; lymphoma for staging, assessment of therapeutic response, and monitoring of relapse [1]. In 2014, after an assessment by the National Commission for the Incorporation of Technologies (Conitec), the Ministry of Health incorporated four clinical indications of the technique to the Unified Health System (SUS): clinical staging of potentially resectable non-small cell lung cancer; detection of colorectal cancer metastasis, exclusively hepatic and potentially resectable; staging and assessment of treatment response for Hodgkin's Lymphoma and Non-Hodgkin's Lymphoma [2]. Before inclusion, the right to undergo the exam for those who did not have health insurance and could not pay was through the courts [3]. Since 2014, there has been no inclusion of new indications for SUS coverage. ANS increased the number of PET-CT procedures from three to nine [4]. In this scenario, considering PET-CT as a recent, complex and high-cost technology, the present study aims to raise a discussion about the diagnostic potential of the ^{18}F-PET-CT method and the need to include other clinical indications for reimbursement by SUS.

2. Methodology

In this work, to support the discussion about the potential diagnosis of ^{18}F-PET-CT and the need to expand its offer by the SUS, a database was created for this procedures performed in a private manner and with agreements at the Molecular Technology Center - Faculty of Medicine/UFMG (CTMM-FM/UFMG). Data were obtained by consulting the medical records of patients who underwent ^{18}F-PET-CT examination in the period from 2012 to 2019. The following information was collected: date of examination, date of birth, gender, age, type of cancer (in the case of cancer patients) and clinical indication. Data were stored in tables and later worked in the Infogram® program, where graphs were generated to facilitate the interpretation of the collected information.

3. Results and Discussion

We was observed that of the total number of exams performed, 94.14% were exams aimed at oncological cases and only 4.86% corresponded to non-oncological clinical indications. Analyzing the profile of cancer exams performed at the CTMM (Figure 1), it is observed that Non-Hodgkin's Lymphoma (NHL) has the greatest demand for exams, followed by colon cancer; Hodgkin's Lymphoma (HL) occupies the third position, followed by the remaining breast cancer in fourth place. The fifth, sixth and seventh places correspond respectively to lung cancer, ovarian cancer and diffuse lymphoma (DL).

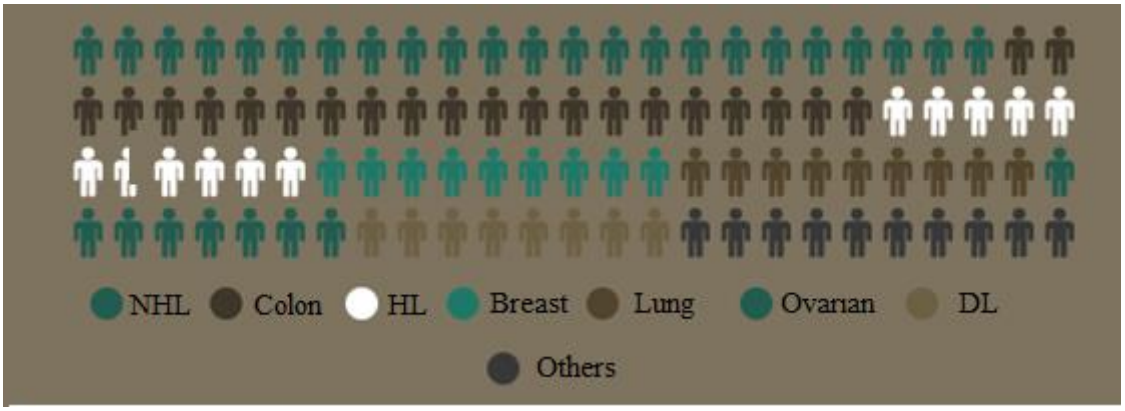

Figure 1: Clinical indications of ^{18}F-PET-CT exams performed by type of cancer

Regarding the clinical indication, we observed that staging was present in most of the requests, followed by the assessment of therapeutic response, in third place was the diagnosis, in fourth place the recurrence evaluation, in fifth and sixth respectively were the evaluation of disease activity and research of metastasis. By analyzing the information, we observed that the age group that most demanded exams was the adult aged between 31 and 71, children and young people aged between 7 and 31 years old occupied second place in the search for tests at the CTMM-FM/UFMG, already in third place the elderly patients were aged between 72 and 88 years. The mean age of patients was 55 years, with a very similar distribution per year; only in 2018 there was a greater discrepancy in which the mean age of patients was 70 years. It was also found that both in younger and older patient's cases of Lymphoma prevailed. With regard to distribution by sex, we observed the prevalence of demand for exams among females.

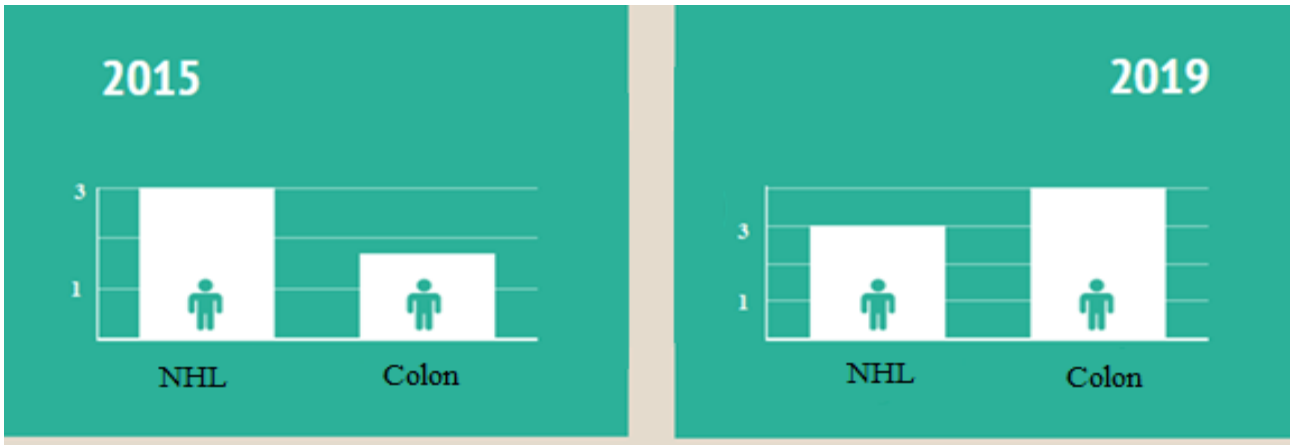

Figure 2: Comparison between the numbers of exams performed with diagnostic indication associated with NHL and colon cancer for the years 2015 and 2019.

Analyzing the Infographic in Figure 2 we can be seen that even with its inclusion in the SUS reimbursement table in 2014, both Non-Hodgkin Lymphoma and colon cancer continue to be the main exams performed in a particular way in the CTMM-FM/UFMG. It is also worth mentioning an increase in the demand for exams for colon cancer. The explanation for this increase may lie in the relevance of the method for investigating these pathologies, which results in greater prescriptions made by physicians. However, due to the delay in the authorization of the procedure by the SUS, some patients choose to undergo the exam on a private basis.

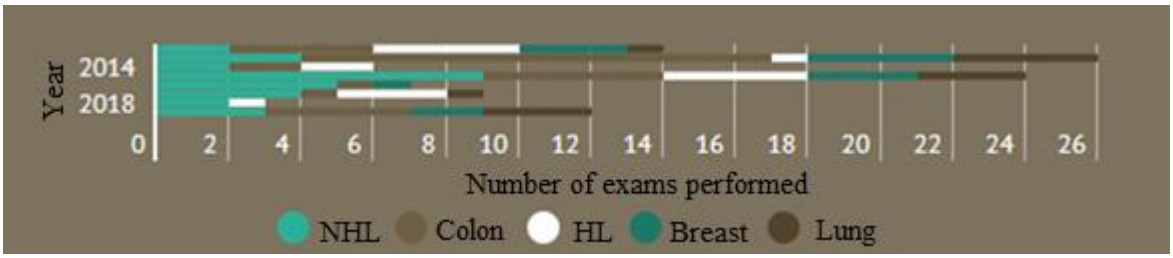

Figure 3: Evolution of the distribution of the number of exams by diagnostic indication in the studied period

The graph represented in Figure 3 shows the variation of exams per year between 2012 and 2019 for the most incident types of cancer in patients treated at the CTMM –FM/UFMG in a private form. Analyzing the graph, we notice that in 2013 there is a prevalence of colon cancer assessment, in 2014 there is a balanced distribution. In the following years, even with the increase in SUS coverage, Non-Hodgkin's Lymphoma was the one that had the greatest demand.

In a recent study, Hyland *et al.* (2020) pointed out that the value of PET/CT for staging non-small cell lung cancer is well established and considered cost-effective. On the other hand, they explored the study practices for staging at 4 cancer centers in the United States of geographically different patients with high molecular risk stage II-III breast cancer. They sought to determine the clinical value and cost-effectiveness of PET/CT as an initial staging procedure compared to standard imaging. They concluded the need for greater awareness of the impact of staging on patients, cost variation, and the ability to set prices at the institutional level to keep PET/CT competitive with other diagnostic techniques [5]. As an example of this study, we observe the need for in-depth study of the potential of the technique, since the results obtained point to an important diversity of applications.

4. Conclusions

After analyzing the results, it is concluded that, in general, the non-oncological applications of ^{18}F-PET-CT are still low, even with studies that prove the method's effectiveness. With regard to oncological applications, ^{18}F-PET-CT has established itself as an effective method for diagnosing functional imaging, especially in staging, in evaluating therapeutic response and evaluating relapse. Even with the list of clinical recommendations drawn up by competent entities, the coverage of the procedure by the SUS is deficient. Studies aimed at incorporating new clinical indications into the SUS are needed, in order to allow a better use of the diagnostic potential of the PET-CT modality. In addition to guaranteeing greater access for the population to this diagnostic modality, providing a more accurate diagnosis and thus avoiding unnecessary burdens on the SUS with legal proceedings.

Acknowledgements

We would like to thank Molecular Technology Center - Faculty of Medicine (CTMM -FM) for the partnership in carrying out this research.

References

[1] V. Ana Luiza et al., "Avaliando a difusão de tecnologias médicas no sistema de saúde privado no Brasil: o caso da tomografia por emissão de pósitrons (PET)", *Revista Brasileira de Saúde Materno Infantil*, vol. 10, pp. s187-s200 (2010).

[2] NO SUS–CONITEC, Incorporação de Tecnologias. PET-CT no Estadiamento do Câncer Pulmonar De Células Não Pequenas. (2014).

[3] A. G. Ana Cecília Lima et al. "Uso do PET-CT na ginecologia: presente e future", *Revista Eletrônica Acervo Saúde*, vol. 12, n. 10, pp. e5265-e5265 (2020).

[4] "Anexo II – Diretrizes de utilização para cobertura de procedimentos na saúde suplementar" https://www.gov.br/ans/pt-br/arquivos/assuntos/consumidor/o-que-seu-plano-deve-cobrir/Anexo_II_DUT_2021_RN_465.2021_TEA.AL.pdf.

[5] C. J. Hyland et al., "Use of 18F-FDG PET/CT as an initial staging procedure for stage II–III breast cancer: a multicenter value analysis", *Journal of the National Comprehensive Cancer Network*, vol. 18(11), pp. 1510-1517 (2020).